Programs and Abstracts

TIMES-iCON2019

The 4th Technology Innovation Management and Engineering Science International Conference

11th - 13th December 2019, Thailand

Organized by

The Association of Thai Digital Industries

and

Mahidol University

IEEE Catalog Number: CFP19R77-ART

ISBN: 978-1-7281-3755-1

IEEE Catalog Number (USB): CFP19R77-USB

ISBN: 978-1-7281-3754-4

Table of Contents

Welcome Message from the General Chair

On behalf of the Organizing Committee, it is our greatest honor to welcome you to The 4th Technology Innovation Management and Engineering Science International Conference (TIMES-iCON2017), hosted at Grad Mercure Fortune Hotel, Bangkok Thailand, 11th -13th December 2019. TIMES-iCON2019 is organized by the Association of Thai Digital Industries (ATDI) and Information Technology Management Program of Faculty of Engineering at Mahidol University. The TIMES-iCON2019 features a world-class conference that brings together researchers and practitioners in the field of management, innovation technology and information technology for the societal digital economy. TIMES-iCON2019 provides an opportunity for academic and industry professionals to present and discuss the various issues and latest research progress in the area related to the smart technology and digital economy such as technology and innovation management approaching to digital economy era, innovation management, information technology management, digital economy, data science, big data, smart engineering technology, corporate management, social management, education management, and healthcare informatics.

We would like to express our sincere gratitude to everyone involved in making the conference a success. Many thanks go to advisory board members, the organizing committees, the keynote speaker, the program committee and reviewers, the session chairs, the conference participants, and of course, to all the contributing authors who will be sharing the innovation and novelty of their high quality research.

We wish our best wishes for an awesome staying in Bangkok!

Assistant Professor Supaporn Kiattisin, PhD

TIMES-iCON2019 General Chair

Message from Secretary

Technology Innovation Management and Engineering Science International Conference (TIMES-iCON), which is an annual international conference, will be the most comprehensive conference focused on management, innovation technology and information technology covering the research areas of the digital economy, digital society, digital healthcare, digital organization, digital country, digital government and digital transformation and other related fields. In this year, the TIMES-iCON 2019 is the 4th international conference held in Bangkok, Thailand, on December 11th – 13th, 2019, at Fortune Mercure Hotel.

As this is the second year, I would like to thank the IEEE Thailand Section who is the main supporter for an inclusion in the IEEE database i.e. "All accepted papers are expected to be included in IEEE Xplore and indexed by EI." I also would like to thank The Association of Thai Digital Industries (ATDI) for the financial sponsor, IT management (Faculty of Engineering, Mahidol University) for the patron, and the networking universities e.g. Graduate School of Commerce, Burapha University; Faculty of Engineering, Srinakharinwirot University; Mahasarakham Business School, Mahasarakham University; College of Arts, Media and Technology, Chiang Mai University; Faculty of Commerce and Management, Print of Songkla University, for their supporters.

This year program consists of 65 technical papers selected with peered review from 90 submissions. The 65 technical papers are selected from 15 countries such as Bangladesh, Czech Republic, India, Indonesia, Japan, Malaysia, Nigeria, Pakistan, P.R. China, Russia, Singapore, South Korea, United Kingdom, USA and Thailand. The TIMES-iCON 2019 technical programs lasting for three day from December 11th – 13th, 2019 is divided into 2 parallel sessions for 13 Tracks. I would like to specially thank our technical program committees and reviewers for their dedicated work in the entire process of reviewing and selecting the papers in the final program.

Finally, I would like to thank the authors, attendees and session chairs for your continued support of the TIMES-iCON 2019 conference. I hope all of you enjoy the excellent conference program at the TIMES-iCON 2019.

Associate Professor Adisorn Leelasantitham, PhD

TIMES-iCON2019 Secretary

Organizing Committee

General Chair

Supaporn Kiattisin *(Mahidol University)*

Technical Program Chair

Sotarat Thammaboosadee *(Mahidol University)*

Smitti Darakorn na Ayutthaya *(Mahidol University)*

Bunlur Emaruchi *(Mahidol University)*

Manutsiri Chansutthirangkool *(Mahidol University)*

Publicity Chair

Prush Sa-nga-ngam *(Mahidol University)*

Wasin Srisawas *(Mahidol University)*

Publication Chair

Adisorn Leelasantitham *(Mahidol University)*

Yutthapong Aunhataweesup *(Mahidol University)*

Jarurote Tippayachai *(Mahidol University)*

Local Arrangement Chair

Taweesak Samanchuen *(Mahidol University)*

Financial Chair

Chanattha Chansutthirangkool *(Mahidol University)*

Luksamee Chujai *(Mahidol University)*

Suchanya Ratsadonniyom *(Mahidol University)*

General Secretary

Adisorn Leelasantitham *(Mahidol University)*

International Steering Committee

B.K. Pal *(National Institute of Technology Rourkela, India)*

Ehab K. A. Mohamed *(The German University in Cairo, Egypt)*

Faizal Arya Samman *(Universitas Hasanuddin, Indonesia)*

Irfan Syamsuddin *(State Polytechnic of Ujung Pandang, Indonesia)*

Jean Paolo G. Lacap *(City College of Angeles, Angeles City, Philippines)*

Jeonghoon Lee *(Korea Institute of Science and Technology Information, South Korea)*

Hanmin Jung *(Korea Institute of Science and Technology Information, South Korea)*

Lance C.C. Fung *(Murdoch University, Australia)*

Manfred Glesner *(University Professor bei Technische Universitaet Darmstadt, Germany)*

Mohamed Basuony *(The American University in Cairo, Egypt)*

Parameshachari B.D. *(Visvesvaraya Technological University, India)*

Ramkumar Ganesan *(University Professor bei Technische Universitaet Darmstadt, Germany)*

Roland Petrasch *(Thammasat University, Thailand)*

Ruchire Eranga Wijesinghe *(Kyungpook National University, South Korea)*

Soochan Kim *(Hankyong National University, South Korea)*

Somkiat Wattanasirichaigoon *(Mahidol University, Thailand)*

Thilini Chathurika Gamage *(Sabaragamuwa University of Sri Lanka, Sri Lanka)*

List of Reviewers

Adisorn Leelasantitham *(Mahidol University)*

Apichat Terapasirdsin Rajamangala *(University of Technology Isan)*

Apinan Aurasopon *(Mahasarakham University)*

Atichart Harncharnchai *(Chiang Mai University)*

Hanmin Jung *(Institute of Science and Technology Information)*

Itthiphol Kampoonga *(Mahasarakham University)*

Jean Paolo G. Lacap, *(City College of Angeles, Angeles City)*

Jeonghoon Lee *(Institute of Science and Technology Information)*

Kairoek Choeychuen *(Rajamangala University of Technology Rattanakosin)*

Laor Boongasame *(Bangkok University)*

Manirath Wongsim *(Mahasarakham University)*

Nanti Suthikarnnarunai *(University of the Thai Chamber of Commerce)*

Nattasit Gerdsri *(Mahidol University)*

Parameshachari B.D. *(Visvesvaraya Technological University)*

Proud Arunrangsiwed Suan *(Sunandha Rajabhat University)*

Prush Sa-nga-ngam *(Mahidol University)*

Punnarumol Temdee *(Mae Fah Luang University)*

Raslapat Suteeca *(Chiang Mai University)*

Ratchada Kongkajan *(Thammasat University)*

Roungsan Chaisricharoen *(Mae Fah Luang University)*

Sarunya Lertputtarak *(Burapha University)*

Somkeit Noamna *(Chiang Mai University)*

Sotarat Thammaboosadee *(Mahidol University)*

Supasit Lertbuasin *(Burapha University)*

Taweesak Samanchuen *(Mahidol University)*

Thanatchaphan Petcharat *(Prince of Songkla University)*

Thanwadee Chinda *(Thammasat University)*

Thawatchai Suwanapong *(Prince of Songkla University)*

Watcharachai Wiriyasuttiwong *(Srinakharinwirot University)*

Waranyu Wongseree *(King Mongkut's University of Technology North Bangkok)*

Werapon Chirachalit *(King Mongkut's University of Technology Thonburi)*

Wimol San-umm *(Thai-Nichi Institute of Technology)*

San Ratanasanya *(King Mongkut's University of Technology North Bangkok)*

Somporn Tiacharoen *(King Mongkut's University of Technology North Bangkok)*

Yodying Thanatawee *(Burapha University)*

TIMES-iCON2019 Final Program				
Day 1: Dec 11th, 2019				
17.00 - 18.30	Registration			
Day 2: Dec 12th, 2019				
08:00 - 09:00	Registration			
09.00 - 09.30	Openning Ceremony			
Session Room	Room 1		Room 2	
Session Topic	1. Science and Technology Engineering I		2. Data Science and Big Data I	
Session Chair	Khalid Tantawi		Jakkrit Kunthong	
09:30 -09:45	*1570588761*	*Advances in Industrial Robotics: From Industry 3.0 Automation to Industry 4.0 Collaboration*	*1570590685*	*Feature Selection of Credit Score Factor Based on Smartphone Usage using MCFS*
09:45 -10:00	*1570591812*	*Estimation of Welding Machine Flexibility by Using Data Envelopment Analysis (DEA) with Relative Closeness (RC)*	*1570590406*	*An Empirical Study to Evaluate Structural Similarity for Source Code Translation*
10:00 - 10:15	*1570591894*	*Wavelet Transformation for Hand-Motion Signal Analysis of TIG Welder Performance*	*E03*	*Development of Succulent Species Prediction System by Deep Learning Technique*
10:15 - 10:30	*1570592572*	*Design and Simulation of Reliable Standard Cell Library for INDEP Approach*	*1570594259*	*Mitigating Smart Primary User Emulation Attackers in Cognitive Radio Networks*
10:30 - 10:45	*1570592828*	*Development of Electronics Armor Shirt for the Shooting Practices of Law Enforcement Using Arduino Board*	*1570593865*	*Performance analysis of students based on data mining techniques: a literature review*
10:45 - 11:00	Coffee Break			
Session Room	Room 1		Room 2	
Session Topic	3. Science and Technology Engineering II		4. Data Science and Big Data II	
Session Chair	Tomáš Jurák		Manirath Wongsim	
11:00 - 11:15	*1570594870*	*Optimization Segment Value of Welch Algorithm by Fitting Data Technique for Double Pulse Welding Signal*	*1570595963*	*Analyzing Data Mining and Its Application to Smart Business*
11:15 - 11:30	*1570597167*	*Pros and Cons Analysis of a Flying-wing and a Canard Conceptions for a Special Purpose UAV in High Altitude*	*1570597029*	*A framework factors influencing big data analytics in accounting: case studies in Thailand*
11:30 - 11:45	*1570597571*	*Principles of Ethical Consideration in Safety Critical Software Systems Development*	*1570593954*	*A Survey on Data Stream Mining Towards the Internet of Things Application*
11:45 - 12:00	*1570597730*	*Ergodic Capacity and Outage Probability of Maximal-ratio Combining for Distributed Antenna System with General Configurations*	*1570593847*	*Recommendation Analysis of Candidates for Student Union Leadership Based on Data Mining Techniques*
12:00 - 12:15			*1570594193*	*Deep Learning Review On Drivers Drowsiness Detection*
12:15-13:30	Lunch			

Session Room	Room 1		Room 2	
Session Topic	5. Information Technology Management		6. Digital Education, Innovation and Knowledge Management, Behavioral Sciences and Communication Studies	
Session Chair	Thawatchai Suwanapong		Masaaki Komatsu	
13:30 - 13:45	*1570592807*	*An Analysis of Log Management Practices to reduce IT Operational Costs Using Big Data Analytics*	*1570574961*	*Does Generation X Intend to Use E-Wallet in Daily Transactions?*
13:45 - 14:00	*1570597258*	*Health Information System For Home Visits*	*1570585772*	*Stereotyped Emo Kids: A literature review*
14:00 - 14:15	*1570597275*	*Drug-Use Tracking System*	*1570593595*	*The Meaning of Sharing Information in Citizen Journalism*
14:15 - 14:30	*1570592635*	*Impact of Correlation-based Feature Selection on Photovoltaic Power Prediction*	*1570590267*	*Thailand's Learning Management Development for 21st Century Students Based on Singapore's Framework*
14:30 - 14:45	*1570595024*	*An Security Analysis of Ext Filesystem metadata*	*1570597338*	*Investigating the Next Level Digital Divide in Indonesia*
14:45 - 15:00	*1570591290*	*SMOTE Approach for Predicting the Success of Bank Telemarketing*	*1570597429*	*Knowledge Management and Transfer to the Future's World Largest Project in Space*
15:00-15:15	Coffee Break			
Session Room	Room 1		Room 2	
Session Topic	7. Blockchain Applications and IoT, Economic and Technology, Science and Technology Engineering		8. Strategic Management, Change Management and Entrepreneurship, HR Management and Organizational Development	
Session Chair	Marko Suvajdzic		Desmond Wong	
15:15 - 15:30	*1570596101*	*Practical Anti-Counterfeit Medicine Management System Based on Blockchain Technology*	*1570579227*	*Motivation of Entrepreneurs for Service Innovation*
15:30 - 15:45	*1570596479*	*Blockchain Art and Blockchain Facilitated Art Economy: Two Ways in Which Art and Blockchain Collide*	*1570597614*	*Factor Influencing Labor Productivity On-Site Construction in Phnom Penh, Cambodia*
15:45 - 16:00	*1570596384*	*Blockchain-based Integrity Protection System for Cloud Storage*	*1570591560*	*A viable system perspective on cluster development*
16:00 - 16:15	*1570596836*	*An Ergonomic Chair with Internet of Thing Technology using SVM*	*1570597024*	*The Evolution of Patent Application Strategies of Companies in the Commercial Aircraft Industry Through a Dynamic Capability Lens*
16:15 - 16:30	*1570593308*	*Net Zero Energy Building achievement of energy efficient home*	*1570594048*	*Value Added of Software Business for runners group using factor analysis*
16:30 - 16:45			*1570594091*	*Factors Influencing Supplier Selection for Vendor Managed Inventory Adoption in Hospitals*
18:00 - 22:00	Banquet			

Day 3: Dec 13th, 2019				
08:30 - 09:30	Registration			
Session Room	Room 1		Room 3	
Session Topic	9. Information Technology Management, Science and Technology Engineering		10. Digital Education, Innovation and Knowledge Management, Data Science and Big Data	
Session Chair	Vijay Kumar Sharma		Andreas Handojo	
09:30 - 09:45	*E07*	*Exploring the Usage and the User Interface of Mobile apps for Donors in Natural Disaster in East Java, Indonesia*	*E02*	*A Model of Cooperative Education Competency Expectation of Modern Management and Information Technology*
09:45 - 10:00	*E10*	*Hydrocarbon Compounds Learning Application*	*1570592614*	*Dengue Fever Outbreak Prediction in Surabaya using A Geographically Weighted Regression*
10:00 - 10:15	*E14*	*Communication Process Management within Virtual Work for Startup Entrepreneur*	*E06*	*Museum Visitor Activity Tracker using Indoor Positioning System*
10:15 - 10:30	*E17*	*Server Scalability Using Kubernetes*	*E11*	*Combination of Candlestick Pattern and Stochastic to Detect Trend Reversal in Forex Market*
10:30-10:45	Coffee Break			
Session Room	Room 1		Room 3	
Session Topic	11. Behavioral Sciences, Communication Studies and Information Management, Organizational Culture and Leadership in Digital Era		12. Digital Business,Innovation and Knowledge Management, Data Science and Big Data, Science and Technology Engineering	
Session Chair	Noppadol Phaosathianphan		Taweesak Samanchuen	
10:45 - 11:00	*E08*	*Factors influencing the intentions of customer with regard to the use of E-WOM behavior to promote the use of E-commerce websites*	*E18*	*An Analytical Data Monetization Value Chain for Educational Process Improvement under Thai University Central Admission System*
11:00 - 11:15	*E12*	*Cultural Tourism Web Service via Augmented Reality for Public Relations in Prachuapkhirikhan Province*	*E15*	*Selection of Logistics Service Provider for e-Commerce using AHP and TOPSIS: A case study of SMEs in Thailand*
11:15 - 11:30	*E13*	*Integrate Digital Twin to Exist Production System for Industry 4.0*	*E19*	*A Reviewof Wireless Power Transfer for Electric Vehicle: Technologies and Standards*
11:30 - 11:45	*E16*	*The Performance Evaluation of a Website using Automated Evaluation Tools*	*E20*	*The best business model for improving the competitiveness of local convenience store in thailand*
11:45 - 12:00	*E21*	*Factors influencing motivation of subscribe to the beauty youtube Channels*	*E05*	*Participatory Heuristic Evaluations of Jeliot Mobile: End-users evaluating usability of their mlearning application*
12:00 - 13:30	Lunch			
Session Room	Room 1			
Session Topic	13. Digital Education, Strategic Management, Change Management and Entrepreneurship, Organizational Culture and Leadership in Digital Era			
Session Chair	Theeraya Mayakul			
13:30 - 13:45	*E22*	*Fake news and online disinformation: a perspectives of Thai government officials*		
13:45 - 14:00	*E23*	*A Comparison of National Enterprise Architecture and E-government perspective*		
14:15 - 14:30	*E24*	*A perspective of thai government information service*		
14:30 - 14:45	*E25*	*Communication "Digital Spillover" And Implications to Thailand's Digital Economy Policy*		
14:45 - 15:00	*E26*	*Vessel silhouette identification based on edge detection*		
15:00 - 15:30	Coffee Break			
Conference End				

Document details - Combination of Candlestick Pattern and Stochastic to Detect Trend Reversal in Forex Market

TIMES-iCON 2019 - 2019 4th Technology Innovation Management and Engineering Science International Conference

December 2019, Article number 9024485

4th Technology Innovation Management and Engineering Science International Conference, TIMES-iCON 2019; Fortune Mercure HotelBangkok; Thailand; 11 December 2019 through 13 December 2019; Category numberCFP19R77-ART; Code 158371

Combination of Candlestick Pattern and Stochastic to Detect Trend Reversal in Forex Market(Conference Paper)

Noertjahyana, A., Abas, Z.A., Yusoh, Z.I.M.

[a]Petra Christian University Surabaya, Informatics Department, Indonesia
[b]Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka Melaka, Malaysia

Abstract

A variety of ways traders do to determine the decision to buy/sell on the forex market. It bases one that is popular on candle patterns. Some strategies that use candle patterns include: pin bar, engulfing, and inside the bar. But the strategy used is still limited to determining buying/selling decisions. This research will use a combination of candle pattern strategies and stochastic moving average to determine the level of risk that exists in each buy/sell decision on the forex market. By using this combination, the results are good in Eur/USD pairs. © 2019 IEEE.

Author keywords

Candlestick Pattern | Combination Method | Forex Prediction

Indexed keywords

Engineering controlled terms: Commerce | Stochastic systems

Engineering uncontrolled terms: Candlestick Pattern | Combination method | Forex markets | Moving averages

Engineering main heading: Engineering research

ISBN: 978-172813755-1
Source Type: Conference Proceeding
Original language: English

DOI: 10.1109/TIMES-iCON47539.2019.9024485
Document Type: Conference Paper
Sponsors: The Association of Thai Digital Industries (ATDI)
Publisher: Institute of Electrical and Electronics Engineers Inc.

Prominence percentile:

Combination of Candlestick Pattern and Stochastic to Detect Trend Reversal in Forex Market

Agustinus Noertjahyana
Informatics Department
Petra Christian University
Surabaya, Indonesia
agust@petra.ac.id

Agustinus Noertjahyana, Zuraida Abal Abas, Zeratul Izzah Mohd Yusoh
Faculty of Information and Communication Technology
Universiti Teknikal Malaysia Melaka
Melaka, Malaysia

***Abstract*—A variety of ways traders do to determine the decision to buy/sell on the forex market. It bases one that is popular on candle patterns. Some strategies that use candle patterns include: pin bar, engulfing, and inside the bar. But the strategy used is still limited to determining buying/selling decisions. This research will use a combination of candle pattern strategies and stochastic moving average to determine the level of risk that exists in each buy/sell decision on the forex market. By using this combination, the results are good in Eur/USD pairs.**

Keywords— Candlestick Pattern; Combination Method; Forex Prediction

I. INTRODUCTION

Candlestick patterns are one concept of trading that is accurate, simple, easily identified, and profitable. confirm that the candlestick pattern has a high predictive value and can produce positive results. Many traders make buying/selling transactions on the forex market using the candle pattern method. In Japanese candlesticks, there are several kinds of candle patterns to support the trend that is a reversal or continue [1], but often a candle pattern is formed which should be a reversal trend to continue or vice versa. A trader needs to combine with other methods to better find out whether the trend on the candle reversal or continue. In technical analysis, many researchers conduct research by only looking at the level of benefits that can be obtained when using certain methods, but few researchers by measuring the level of risk got per transaction.

Based on our method, this article develops a trading system method by using a candle pattern to look for trend changes while measuring the level of risk that occurs in each transaction.

This developed we have tested system on one of the main forex pairs, Eur / USD. As a result, this method can provide alternative benefits to traders who use candlestick patterns in decision making.

II. BACKGROUND

Trading on the forex market has considerable challenges, where trading volatility is high and the range of price movements is large enough every day. Traders who make transactions often always look at the chart continuously for fear of loss because of not understanding the level of risk when making transactions. Although there are several methods to determine stop loss based on technical indicators, it is still a matter of debate because there is no correct and accurate method that can beat the market because prices can change randomly and move quickly [2].

Because the stock market and the forex market have high similarities, we can use the technical indicators used in the stock market in the forex market, although there are some adjustments [3]. Some methods are suitable for the stock market but are less successful when implemented in the forex market.

Several studies [4][5] have found methods that can be implemented in trading rules, which analyze the Dow-Jones index. Some authors use a computational intelligence approach to design and develop technical trading strategies such as genetic algorithms, neural networks, fuzzy logic and data mining[6].

[7][8] used genetic algorithms to study the rules of technical trade and they found that the rules did not get significant benefits. [9] combines simple technical methods and neural networks to gain nonlinear profitability and predictability on the stock market. [10] propose a method for designing and testing stock market trading systems using artificial neural networks. And some Fuzzy Logic which specifically allows a significant increase in the financial analysis [11][12]. We can find fuzzy controls on trade-in [5] and [13]. All the methods above forecast, but it is not a decision to make a transaction.

In the last few decades, several interesting uses of Japanese candlesticks have appeared. [14] applies an expert system with IF-THEN rules that detect candle patterns and offer to sell and buy decisions, with a good ratio on the Korean market.

III. METHODOLOGY

This paper assists traders in making decisions to buy/sell transactions based on candlestick patterns and determine the level of risk of each transaction based on a reversal candle. This reversal candle is a candle that is the opposite of the previous candle and the close position is bigger or smaller than the previous candle. We will combine this method with the Stochastic method based on the Simple Moving Average.

A. *Candlestick Pattern Selection*

Candlestick charts require four fundamental price data (open, high, low, and close) to arrange a chart, just like a bar chart. However, candle charts are easier to understand than bar charts. We believe that one or more candle patterns can describe market conditions and emotions [1]. We can see candlestick charts in Fig 1.

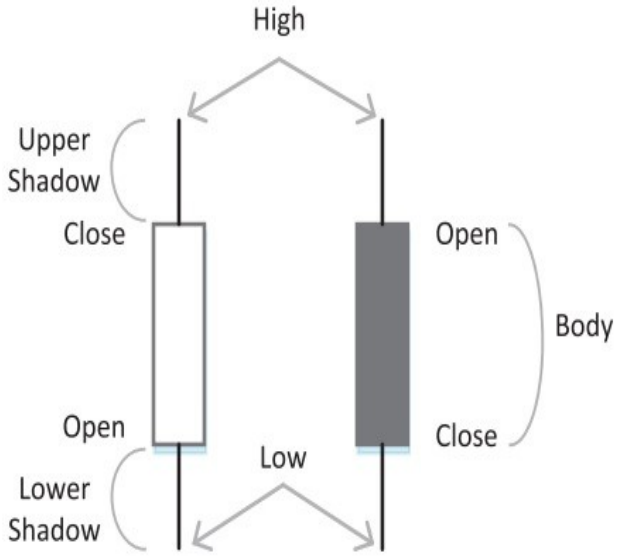

Fig. 1. Candlestick Chart

First, we must look at the T-1 candle. If T-1 is a Bullish Candle, is the Close Candle T-1 higher than the High Candle T-2. If T-1 is a Bearish Candle, is the Close Candle T-1 lower than the Low Candle T-2. Example, See Fig. 2. Bullish Candle is described as an empty box, while we describe the Bearish Candle as a black square. Stop Loss uses the open limit if the T candle is a Bearish candle, while the Stop Loss uses the Close limit if the T candle is a Bullish candle. We expect it to minimize the risk of loss if an error occurs in the decision to buy/sell.

B. *Compare with Stochastic*

Second, compare with Stochastic.

If the T-1 Candle is a Bearish Candle, then observe whether the Stochastic is between 20-100, and if the T-1 Candle is a Bullish Candle, then observe whether the Stochastic is in the 0-80 range

C. *If-Then Rules*

The implemented rules are:

If the T-1 Bearish Candle and Stochastic are between 20-100, then the decision is Sell and if the T-1 Bullish Candle and Stochastic are between 0-80, then the decision is Buy.

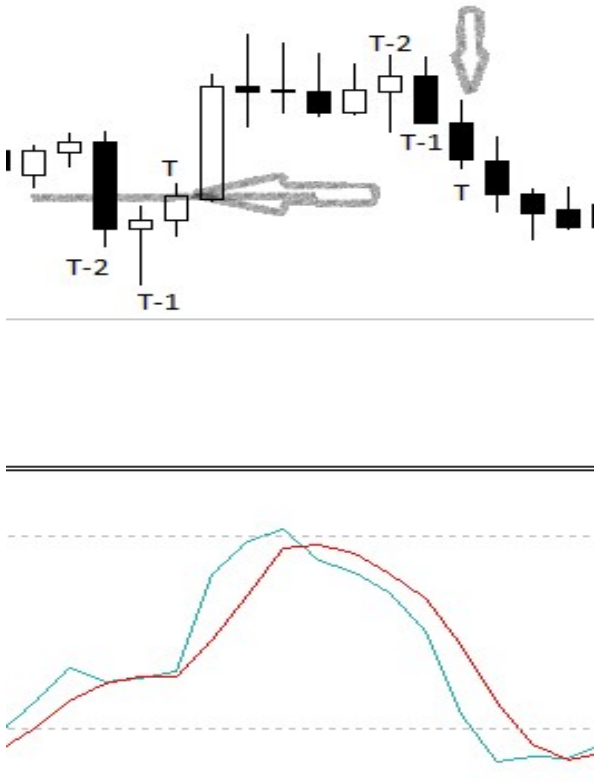

Fig. 2. Example of Bearish and Bullish Candle

IV. RESULT AND DISCUSSION

To test the method, we use pair Eur/USD in the period of 1 January 2018 to 31 December 2018. Using the MetaTrader 4 software, we tested it with 2 scenarios. The first scenario is to set Profit at 30 pips and Stop Loss under Candle T-1, and the second scenario is to set Profit at 35 pips and Stop Loss under Candle T-1. We can see the results of the test in table 1.

TABLE I. TRANSACTION RESULT

Type	Total	Target Profit	Win(pips)	Loss(pips)
Buy	35	30	1950	1094
Sell	45	35	2135	1347

Based on Table 1, that during 1 year of trading testing there were more Sell decisions than Buy, where if a trader uses a 30 pips Profit Target, then the trader will get a profit ratio of around 64%, whereas if using a 35 pips Profit Target, the trader will get a percentage of profits off around 61%.

The total profit that can be obtained in the form of value if the trader uses a 30 pips Profit Target is $856 (with 1 pips = $1). Whereas if a trader uses a 35 pips Profit Target will get a profit of $788 (with 1 pip = $1) Based on Table 1, that during 1 year of trading testing there were more Sell decisions than Buy, where if a trader uses a 30 pips Profit Target, then the trader

will get a profit ratio of around 64%, whereas if using a 35 pips Profit Target, the trader will get a percentage of profits off around 61%.

V. CONCLUSION AND FUTURE WORK

Based on testing that has been done, we can conclude it that using only the combination of candlestick and stochastic methods can produce a profit for a trader. The next research will be to minimize losses by using Fuzzy logic as a reference to determine the rules on the risk of loss so it can further minimize losses if there are errors in decision making.

ACKNOWLEDGMENT *(Heading 5)*

The Directorate General of Higher Education Indonesia sponsored this research project on the scheme "Penelitian Terapan Unggulan Perguruan Tinggi" in 2019. Many thanks to the Center of Research, Petra Christian University, Surabaya, Indonesia for the great wonderful piece.

REFERENCES

[1] [1] S. Nison, *Japanese Candlestick*. 2001.

[2] [2] E. F.Fama, "Efficient Capital Markets: A Review Of Theory And Empirical Work," *J. Finance*, vol. 25, no. 2, pp. 383–417, 1970.

[3] [3] K. K. Ludmila Dymova, Pavel Sevastjanov, "A Forex trading expert system based on a new approach.pdf," *Expert Systems With Applications*, vol. 51. pp. 1–13, 2016.

[4] [4] J. Baruník, E. Kočenda, and L. Vácha, "Asymmetric volatility connectedness on the forex market," *J. Int. Money Financ.*, vol. 77, pp. 39–56, 2017.

[5] [5] R. Naranjo, A. Meco, J. Arroyo, and M. Santos, "An intelligent trading system with fuzzy rules and fuzzy capital management," *Int. J. Intell. Syst.*, 2015.

[6] [6] Y. Lee, L. C. O. Tiong, and D. C. L. Ngo, "Hidden Markov Models for Forex Trends Prediction," in *2014 International Conference on Information Science & Applications (ICISA)*, 2014, pp. 1–4.

[7] [7] X. Liu, H. An, L. Wang, and X. Jia, "An integrated approach to optimize moving average rules in the EUA futures market based on particle swarm optimization and genetic algorithms," *Appl. Energy*, vol. 185, pp. 1778–1787, Jan. 2017.

[8] [8] R. Naranjo, J. Arroyo, and M. Santos, "Fuzzy modeling of stock trading with fuzzy candlesticks," *Expert Syst. Appl.*, vol. 93, pp. 15–27, Mar. 2018.

[9] [9] N. Gradojevic and R. Gençay, "Fuzzy logic, trading uncertainty and technical trading," *J. Bank. Financ.*, vol. 37, no. 2, pp. 578–586, Feb. 2013.

[10] [10] B. Vanstone and G. Finnie, "Enhancing stockmarket trading performance with ANNs," *Expert Syst. Appl.*, vol. 37, no. 9, pp. 6602–6610, 2010.

[11] [11] P. Puhakainen *et al.*, "InfoSec Reading Room," *Inf. Secur.*, 2015.

[12] [12] R. M. L. G. and J. J. C., "A multiple fuzzy inference systems framework for daily stock trading with application to NASDAQ stock exchange," *Expert Syst. Appl.*, vol. 44, no. C, pp. 13–21, Feb. 2016.

[13] [13] X. Liu, H. An, L. Wang, and Q. Guan, "Quantified moving average strategy of crude oil futures market based on fuzzy logic rules and genetic algorithms," *Phys. A Stat. Mech. its Appl.*, vol. 482, pp. 444–457, Sep. 2017.

[14] [14] Y. Izumi, T. Yamaguchi, S. Mabu, K. Hirasawa, and Jingle Hu, "Trading Rules on the Stock Markets using Genetic Network Programming with Candlestick Chart," in *2006 IEEE International Conference on Evolutionary Computation*, pp. 2362–2367.